

(1)

$$5 \cdot 4.8 = 24$$

$$y_B = \frac{12}{x_C} : \quad \frac{2x_C \cdot 2y_B}{2} = 24 \quad , \quad \frac{2x_C \cdot 2y_B}{2}$$

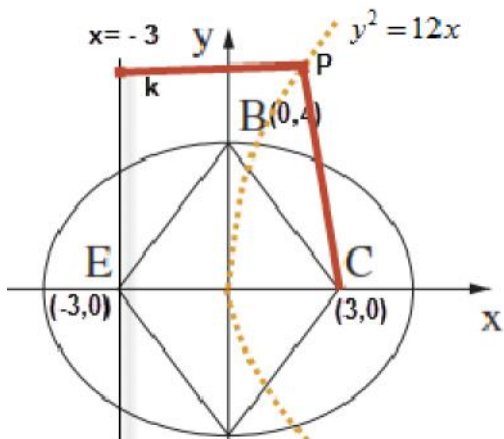
$$(x_C)^2 + \left(\frac{12}{x_C}\right)^2 = 5^2$$

O) ΔBOC

$$(x_C)^4 - 25(x_C)^2 + 144 = 0$$

$$x_C = 3 \rightarrow y_B = 4 \quad \text{o.k. (BD > AC)}$$

$$x_C = 4 \rightarrow y_B = 3 \quad \text{not o.k. (BD < AC)}$$



B(0, 4), C(3, 0), D(0, -4), E(-3, 0) :

$$c = 3, C(3, 0), E(-3, 0) \quad (2)$$

$$b = 4, B(0, 4), D(0, -4)$$

$$a = \sqrt{4^2 + 3^2} = 5, a^2 - b^2 = c^2$$

2a

$$BC + BE = 2 \cdot 5 = 10 \rightarrow a = 5 :$$

$$\frac{x^2}{25} + \frac{y^2}{16} = 1$$

$$y^2 = 2px$$

$$M(\sqrt{15}, y_M)$$

$$y_M = 1.25, \quad \frac{\sqrt{15}^2}{25} + \frac{y^2}{16} = 1$$

$$p = 6, \quad \sqrt{15}^2 = 2p \cdot 1.25 :$$

$$M(1.25, \sqrt{15})$$

$$C(3, 0), \quad \left(\frac{p}{2}, 0\right) = \left(\frac{6}{2}, 0\right) = (3, 0)$$

$$y^2 = 12x$$

$$E(-3, 0)$$

y

$$x = -3$$

$$C(3, 0)$$

$$y^2 = 12x$$

k

PC

$$\frac{PC}{k} = 1 :$$

SABCD .

$$\vec{AM} = \frac{1}{2} \vec{AC} \quad (1)$$

$$\vec{SM} = \frac{1}{2} \vec{SA} + \frac{1}{2} \vec{SC}$$

$$\vec{AM} = \vec{AS} + \vec{SM}$$

$$\vec{AM} = \vec{AS} + \frac{1}{2} \vec{SA} + \frac{1}{2} \vec{SC}$$

$$\vec{AM} = \vec{AS} - \frac{1}{2} \vec{AS} + \frac{1}{2} \vec{SC}$$

$$\vec{AM} = \frac{1}{2} \vec{AS} + \frac{1}{2} \vec{SC}$$

$$\vec{AM} = \frac{1}{2} (\vec{AS} + \vec{SC})$$

$$\vec{AM} = \frac{1}{2} \vec{AC}$$

∴

$$\vec{SM} \perp \vec{AC} \quad (2)$$

ΔSAC -

SM - , AC

M (1)

SM - ,

M ,

.AC -

∴

SM (3)

.(2)

SM ,

M

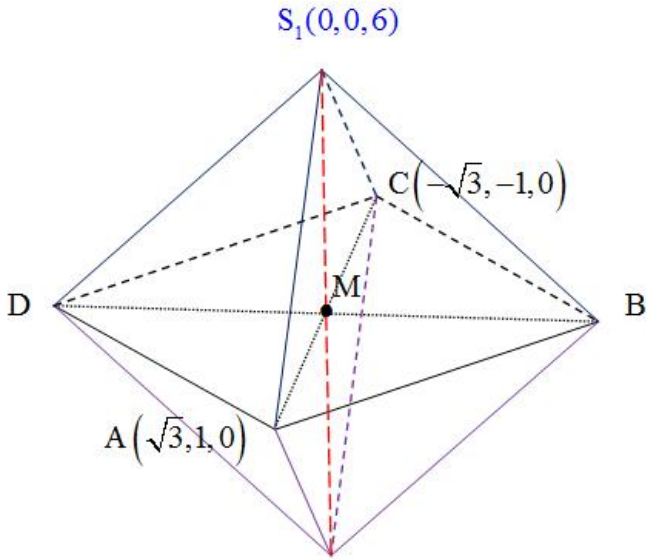
∴

$(z_A = z_C = 0)$, $C(-\sqrt{3}, -1, 0)$, $A(\sqrt{3}, 1, 0)$:
 $z = 0$, $z = 0$ B - D

$(AC \quad M)$ (1)

$$M\left(\frac{\sqrt{3} + (-\sqrt{3})}{2}, \frac{1 + (-1)}{2}, \frac{0 + 0}{2}\right) = M(0, 0, 0)$$

$(\quad) M(0, 0, 0)$:



$16 \quad S_{ABCD}$ (2)

$$\overline{AC} = \underline{C} - \underline{A} = \underline{x} = (-2\sqrt{3}, -2, 0)$$

$$|\overline{AC}| = \sqrt{(-2\sqrt{3})^2 + (-2)^2 + 0^2} = 4$$

$$S_{ABCD} = \frac{4 \cdot 4}{2} = 8$$

$$16 = \frac{8 \cdot |\overline{SM}|}{3}$$

$$|\overline{SM}| = 6$$

$S_2(0, 0, -6)$, $S_1(0, 0, 6)$:

AS_1S_2 , $d = 0$ - , $c = 0$, z - S_1MS_2 (1) .

$$\overline{MA} = \underline{A} - \underline{M} = \underline{x} = (\sqrt{3}, 1, 0)$$

$$(a, b, 0) \cdot (\sqrt{3}, 1, 0) = 0$$

$$a\sqrt{3} + b = 0$$

$$a = 1 \rightarrow b = -\sqrt{3}$$

$x - \sqrt{3}y = 0$ AS_1S_2 :

AS_1S_2 , AMS C (2)

$$-\sqrt{3} + \sqrt{3} \cdot 1 = 0 \rightarrow 0 = 0 \text{ o.k. :}$$

AS_1S_2 C :

$$\cdot z^3 = -1 \quad \cdot$$

$$z^3 = 1 \operatorname{cis}(180^\circ)$$

$$z_k = \sqrt[3]{1} \operatorname{cis}\left(\frac{180^\circ}{3} + \frac{360^\circ k}{3}\right)$$

$$z_k = \operatorname{cis}(60^\circ + 120^\circ k)$$

$$z_1 = \operatorname{cis} 60^\circ = 0.5 + \frac{\sqrt{3}}{2}i$$

$$z_2 = \operatorname{cis} 180^\circ = -1$$

$$z_3 = \operatorname{cis} 300^\circ = 0.5 - \frac{\sqrt{3}}{2}i$$

$$\cdot z_3 = \operatorname{cis} 300^\circ = 0.5 - \frac{\sqrt{3}}{2}i, \quad z_2 = \operatorname{cis} 180^\circ = -1, \quad z_1 = \operatorname{cis} 60^\circ = 0.5 + \frac{\sqrt{3}}{2}i :$$

$$z_3 = \frac{z_3}{z_2}, \quad z_2 = \frac{z_2}{z_1} \quad (1)$$

$$\frac{z_3}{z_2} = \frac{\operatorname{cis} 300^\circ}{\operatorname{cis} 180^\circ} = \operatorname{cis}(300^\circ - 180^\circ) = \operatorname{cis}(120^\circ)$$

$$\frac{z_2}{z_1} = \frac{\operatorname{cis} 180^\circ}{\operatorname{cis} 60^\circ} = \operatorname{cis}(180^\circ - 60^\circ) = \operatorname{cis}(120^\circ)$$

$$\cdot q = \operatorname{cis}(120^\circ) \quad ,$$

$$\frac{z_3}{z_2} = \frac{z_2}{z_1} =$$

⋮

$$\cdot q = \operatorname{cis}(120^\circ) = z_1 = \operatorname{cis} 60^\circ \quad , \quad z_5 \quad (2)$$

$$z_5 = z_1 q^4 = \operatorname{cis} 60^\circ \cdot (\operatorname{cis} 120^\circ)^4 = \operatorname{cis} 60^\circ \cdot (\operatorname{cis} 120^\circ \cdot 4) = \operatorname{cis} 60^\circ \cdot (\operatorname{cis} 480^\circ)$$

$$z_5 = \operatorname{cis}(60^\circ + 480^\circ) = \operatorname{cis} 540^\circ$$

$$\boxed{z_5 = \operatorname{cis} 180^\circ = -1}$$

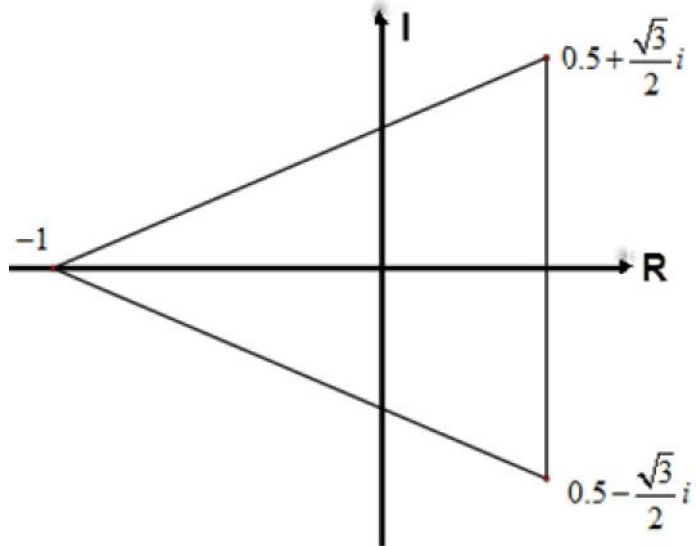
$$\cdot z_5 = \operatorname{cis} 180^\circ = -1 :$$

ΔABC

$z_{15} = z_{14}, z_{13}$ (1)

$\cdot cis 300^\circ - cis 180^\circ, cis 60^\circ$

$z_4 = z_3 q = cis 300^\circ \cdot cis 120^\circ = cis 420^\circ = cis 60^\circ :$



$$S = \frac{\left[\frac{\sqrt{3}}{2} - \left(-\frac{\sqrt{3}}{2}\right) \right] [(0.5 - (-1))]}{2}$$

$$S = \frac{\sqrt{3} \cdot 1.5}{2} = \frac{3\sqrt{3}}{4}$$

$\cdot \frac{3\sqrt{3}}{4} \Delta ABC :$

$\cdot cis 300^\circ - cis 180^\circ, cis 60^\circ : z_n$

, (1) ' - (2)

, $\Delta ABC - \Delta KLM -$

: :

$$f(x) = \frac{e^{x^2} - 2x}{e^{x^2}}$$

(1)

$$f(x) = \frac{e^{x^2} - 2x}{e^{x^2}} = 1 - \frac{2x}{e^{x^2}}$$

$$f'(x) = -\frac{2e^{x^2} - 2x \cdot 2x \cdot e^{x^2}}{(e^{x^2})^2}$$

$$f'(x) = -\frac{2e^{x^2}(1 - 2x^2)}{(e^{x^2})^2}$$

$$\boxed{f'(x) = \frac{2(2x^2 - 1)}{e^{x^2}}}$$

$$f'(x) = \frac{e^{x^2}(2x \cdot e^{x^2} - 2) - (e^{x^2} - 2x) \cdot 2x \cdot e^{x^2}}{(e^{x^2})^2}$$

$$f'(x) = \frac{e^{x^2} [2x \cdot e^{x^2} - 2 - 2x(e^{x^2} - 2x)]}{(e^{x^2})^2}$$

$$f'(x) = \frac{2x \cdot e^{x^2} - 2 - 2xe^{x^2} + 4x^2}{e^{x^2}}$$

$$\boxed{f'(x) = \frac{4x^2 - 2}{e^{x^2}}}$$

$$0 = 4x^2 - 2$$

$$x = \pm \frac{1}{\sqrt{2}}$$

$$(4x^2 - 2)$$

$$x < -\frac{1}{\sqrt{2}} \quad x > \frac{1}{\sqrt{2}}$$

$$, -\frac{1}{\sqrt{2}} < x < \frac{1}{\sqrt{2}}$$

$$\left(-\frac{1}{\sqrt{2}}, 1.858\right), \quad \left(\frac{1}{\sqrt{2}}, 0.142\right) :$$

$$-\frac{1}{\sqrt{2}} < x < \frac{1}{\sqrt{2}}, \quad x < -\frac{1}{\sqrt{2}} \quad x > \frac{1}{\sqrt{2}} : \quad (3)$$

$$f(x) = 1 - \frac{2x}{e^{x^2}} \quad (4)$$

$$y = 1 \quad , 1.0000009 \quad x = 4$$

$$y = 1 \quad , 0.9999999 \quad x = -4$$

:()

, 2x

, $x \rightarrow \pm\infty$

,

e^{x^2}

$$f(x) \rightarrow 1$$

- $x \rightarrow \pm\infty$

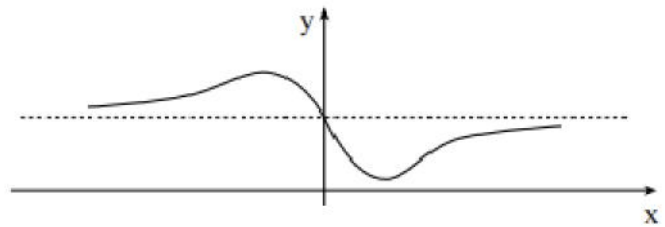
,

.x

,

y = 1 :

$$f(x) = \frac{e^{x^2} - 2x}{e^{x^2}} \quad (5)$$



$$g(x) = \frac{1}{f(x)}$$

(5) - , f(x)

, x

(1)

.x

$$g(x) = \frac{1}{f(x)}$$

∴

(2)

, $f'(x) = 0$, $g(x) = -\frac{f'(x)}{f(x)}$

$g(-\frac{1}{\sqrt{2}}) = \frac{1}{f(-\frac{1}{\sqrt{2}})} = \frac{1}{1.858} = 0.538$, $g(\frac{1}{\sqrt{2}}) = \frac{1}{f(\frac{1}{\sqrt{2}})} = \frac{1}{0.142} = 7.131$

$(-\frac{1}{\sqrt{2}}, 0.538)$, $(\frac{1}{\sqrt{2}}, 7.131)$:

$-\frac{1}{\sqrt{2}} < x < \frac{1}{\sqrt{2}}$, $x < -\frac{1}{\sqrt{2}}$, $x > \frac{1}{\sqrt{2}}$: : (3)

$f(x) \rightarrow 1$, $x \rightarrow \pm\infty$ - (4) - (4)

$g(x) \rightarrow \frac{1}{1} = 1$, $x \rightarrow \pm\infty$,

:

$y = 1$ - , 0.999999 $x = 4$

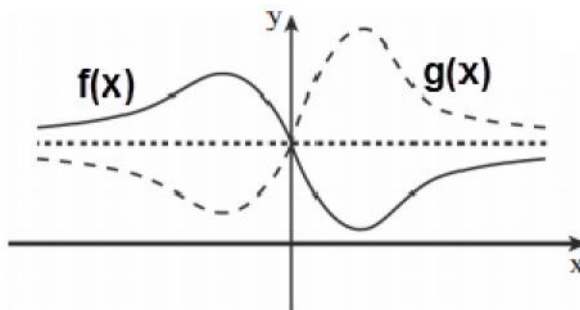
$y = 1$ - , 1.0000009 $x = -4$

$y = 1$:

$g(x) = \frac{f'(x)}{f(x)}$, $f(x) = \frac{e^{x^2} - 2x}{e^{-x^2}}$ (5)

$y = 1$, $y = 1$

(, $y = 1$,)



"

$$h(x) = \frac{x+3}{x}$$

$$x \neq 0$$

$$h(x) > 0$$

$$\frac{x+3}{x} > 0 \quad / \cdot x^2 > 0$$

$$x(x+3) > 0$$

$$x < -3 \quad x > 0$$

$$x < -3 \quad x > 0 :$$

$$f(x)$$

$$f'(x) = \frac{h'(x)}{h(x)} \quad (x < -3 \quad x > 0) \quad h(x) > 0$$

$$f(x)$$

$$f(x) = \int \frac{h'(x)}{h(x)} dx$$

$$f(x) = \int \frac{1}{h(x)} \cdot h'(x) dx$$

$$f(x) = \ln|h(x)| + c$$

$$f(x) = \ln h(x) + c \quad \leftarrow h(x) > 0$$

$$f(x) = \ln \frac{x+3}{x} + c$$

$$f(x)$$

$$(3, \ln 2)$$

$$\ln 2 = \ln\left(\frac{3+3}{3}\right) + c$$

$$\ln 2 = \ln 2 + c$$

$$c = 0$$

$$\boxed{f(x) = \ln\left(\frac{x+3}{x}\right)}$$

$$f(x) = \ln\left(\frac{x+3}{x}\right) :$$

$$f(x) = \ln\left(\frac{x+3}{x}\right)$$

$$x = 0 \text{ - , } +\infty \text{ -}$$

$$, 17.21$$

$$x = 0.000001$$

$$x = -3 \text{ - , } -\infty \text{ -}$$

$$, -17.21$$

$$x = -3.000001$$

$$y = 0 \text{ - , } , y = 0 \text{ -}$$

$$, 2.99 \cdot 10^{-6}$$

$$x = 1000000$$

$$y = 0 \text{ - , } , y = 0 \text{ -}$$

$$, -3 \cdot 10^{-6}$$

$$x = -1000000$$

$$\ln 1 = 0 \text{ -}$$

$$x \rightarrow \pm\infty$$

$$, 1 \text{ -}$$

$$\frac{x+3}{x}$$

$$. y = 0 , x = -3 , x = 0 :$$

$$f(x) = \ln\left(\frac{x+3}{x}\right)$$

$$f'(x) = \frac{\frac{x-(x+3)}{x^2}}{\frac{x+3}{x}}$$

$$f'(x) = \frac{-3}{x^2 \cdot \frac{x+3}{x}}$$

$$. x < -3 \quad x > 0$$

$$. x \text{ - } , x < -3 \quad x > 0 : \quad :$$

$$. f(x)$$

